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In re the application **Clark Debs JEFFRIES, et al.** Confirmation No: **1702**

Serial No: **09/753,965** Group Art Unit: **2661**

Filed: **January 3, 2001** Examiner: **Kading, Joshua A.**

For: **Method and System for Providing An Optimal Path Choice For Differentiated Services**

ENCLOSURES *(check all that apply)*					
☐	Amendment/Reply	☐	Assignment and Recordation Cover Sheet	☐	After Allowance Communication to Group
	☐ After Final	☐	Part B-Issue Fee Transmittal	☐	Notice of Appeal
☐	Information disclosure statement	☐	Letter to Draftsman	■	Appeal Brief
	☐ Form 1449	☐	Drawings	☐	Status Letter
	☐ (X) Copies of References	☐	Petition	■	Postcard
■	Extension of Time Request *	☐	Fee Address Indication Form	☐	Other Enclosure(s) (*please identify below):*
☐	Express Abandonment	☐	Terminal Disclaimer		
☐	Certified Copy of Priority Doc	☐	Power of Attorney and Revocation of Prior Powers		
☐	Response to Incomplete Appln	☐	Change of Correspondence Address		
☐	Response to Missing Parts	*Extension of Term: Pursuant to 37 CFR 1.136, Applicant petitions the Commissioner to extend the time for response for one (1) month, from July 26, 2005 to August 26, 2005.			
	☐ Executed Declaration by Inventor(s)				

CLAIMS					
FOR	Claims Remaining After Amendment	Highest # of Claims Previously Paid For	Extra Claims	RATE	FEE
Total Claims	0	0	0	$ 50.00	$ 0.00
Independent Claims	0	0	0	$200.00	$ 0.00
				Total Fees	$ 0.00

METHOD OF PAYMENT	
■	Check no. 8895 in the amount of $ 120.00 is enclosed for payment of one month extension of time fee.
■	Charge $ 500.00 to Deposit Account No. 50-0563 (IBM Corporation) for payment of appeal brief filing fee.
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Attorney Name	Janyce R. Mitchell, Reg. No. 40,095
Signature	
Date	August 3, 2005

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on August 3, 2005

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPEAL NO:

Clark Debs JEFFRIES, et al. Confirmation No: 1702

Serial No: 09/753,965 Group Art Unit: 2661

Filed: January 3, 2001 Examiner: Kading, J.

For: METHOD AND SYSTEM FOR PROVIDING AN OPTIMAL PATH CHOICE FOR DIFFERENTIATED SERVICES

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APPEAL BRIEF

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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Clark Debs JEFFRIES, et al. Confirmation No: 1702

Serial No: 09/753,965 Group Art Unit: 2661

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For: METHOD AND SYSTEM FOR PROVIDING AN OPTIMAL PATH CHOICE FOR DIFFERENTIATED SERVICES

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P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellant herein files an Appeal Brief drafted in accordance with the provisions of 37 C.F.R. § 1.193(b)(1) as follows:

I. REAL PARTY IN INTEREST

Appellant respectfully submits that the above-captioned application is assigned, in its entirety to International Business Machines Corporation of Armonk, New York.

II. RELATED APPEALS AND INTERFERENCES

Appellant states that, upon information and belief, Appellant is not aware of any co-pending appeal or interference which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 are pending. Application Serial No. 09/753,965 (the instant application) as originally filed included claims 1-14. The claims in the instant application have not been amended. Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 are on appeal and all applied prospective rejections concerning claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 are herein being appealed.

IV. STATUS OF AMENDMENT

There was no proposed amendment to the claims in response to the Final Office Action.

V. SUMMARY OF THE INVENTION

The present invention provides a path for a new flow between a source node and a destination node in a network. The network has a plurality of nodes and a plurality of links between the nodes. The nodes include the source node and the destination node. Each of the links is capable of including a plurality of existing flows and has a capacity. Each of the existing flows has a minimum guaranteed bandwidth. The method and system include determining a benefit for each link of a portion of the plurality of links coupled with a node of the plurality of nodes. The benefit is determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link, the node being a part of the path. The method and system also include selecting a link of the portion of the plurality of links to be part of the path. The link has a maximum benefit for the first portion of the plurality of links and is coupled the node with a second node of the plurality of nodes. Such a mechanism for selecting a path allows new paths having the maximum benefit to be selected for networks

supporting differentiated services. Specification, page 9, line 23-page 10, line 2 and page 13, lines 15-16. The path selected may also result in a more predictable allocation of bandwidth. Specification, page 12, line 23-page 13, line 1.

Figure 1 depicts a conventional network 10 for which a path is to be selected. Specification, page 2, lines 13-14. Figure 2 depicts a conventional method for selecting a path on the conventional network 10. The path starts at a source node and, for each node, computes the cost of traversing a link to the next node. In order to do so, the available bandwidth for each link is calculated based upon the traffic through the link. Specification, page 3, lines 14-29. The link having the largest available bandwidth is considered to be the link having the lowest cost and is, therefore, selected to be part of the path. Specification, page 2, lines 19-22. This process is repeated for each node until the destination node is reached. Specification, page 2, line 22-page 3, line 4. Determination of the path in such a manner does not allow the network to account for differentiated services, in which a customer can pay to have a minimum guaranteed bandwidth regardless of the amount of bandwidth actually used by the customer, resulting paths that have poor bandwidth allocation. Specification, page 5, line 21-page 6, line 8.

In contrast, Figure 3 depicts one embodiment of a method in accordance with the present invention for selecting a path. The benefit for each link is determined and the link having the maximum benefit is selected part of the as the path. Specification, page 9, lines 15 and 19-21. The benefit for each link is based upon the minimum guaranteed bandwidth for each existing flow. Specification, page 9, lines 17-20. This minimum guaranteed bandwidth is a relatively static quantity as it is the bandwidth (e.g. a number of bits per second) for which a customer pays and that must be allocated to that customer regardless of the customer's actual use. Specification, page 5, lines 13-16. Similarly, Figure 4 depicts another embodiment of a method

in accordance with the present invention for selecting a path. The method depicted in Figure 4 also utilizes the minimum guaranteed bandwidth to determine the benefit of a link and the path. Specification, page 10, lines 18-23.

Figure 5 depicts a system in accordance with the present invention that may perform the methods depicted in Figure 3 or 4. The system of Figure 5 utilizes logic that determines the benefit for each link and logic that selects the path based upon the benefit of the link. Specification, page 13, lines 5-14.

Using the method depicted in Figure 3 or Figure 4, the path selected utilizes the minimum guaranteed bandwidth and accounts for differentiated services. Specification, page 12, lines 16-19. Consequently, varying and appropriate levels of service can be provided to different customers. In addition, the path selected may result in a more predictable allocation of bandwidth. Specification, page 12, line 23-page 13, line 1. Thus, performance may be improved.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) whether claims 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, and 13 are each unpatentable under 35 U.S.C. § 103 as being obvious in light of U.S. Patent No. 6,697,333 (Bawa) in view of U.S. Patent No. 6,400,681 (Bertin); and

(2) whether claims 7 and 14 are each unpatentable under 35 U.S.C. § 103 as being obvious over Bawa and Bertin in further view of U.S. Patent No. 5,164,938 (Jurkevich).

VII. ARGUMENTS

A. Summary of the Applied Rejections

In the Final Office Action, dated February 4, 2005, the Examiner rejected Claims 1-6 and 8-13 under 35 U.S.C. § 103 as being unpatentable over Bawa in view of Bertin. In particular, the Examiner cited col. 2, lines 60-64 as teaching determining the benefit for each node and selecting the link having the maximum benefit. The Examiner appeared to acknowledge that Bawa fails to teach or suggest determining the benefit based upon the minimum guaranteed bandwidth. Thus, the Examiner also stated that:

> However, Bawa lacks what Bertin discloses, that is "... the benefit being determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link (. . . where the equivalent capacity [of Bertin] represents a guaranteed minimum bandwidth for the link) . . ."

The Examiner also cited col. 10, lines 8-40 of Bertin as describing the equivalent capacity. With respect to claims 3 and 11, the Examiner cited col. 10, lines 41-53 of Bertin as teaching determining the benefit by subtracting the minimum guaranteed bandwidth from the capacity.

The Examiner further rejected claims 7 and 14 under 35 U.S.C. § 103 as being unpatentable over Bawa and Bertin in further view of Jurkevich. In so doing, the Examiner cited col. 43 and 44 of Jurkevich as teaching notifying a user if the path cannot exist.

Appellant respectfully requests that the Board reverse the Examiner's final rejection of claims 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, and 13 under 35 U.S.C. § 103 and the Examiner's final rejection of claims 7 and 14 under 35 U.S.C. § 103.

B. The Cited Prior Art

Bawa describes a method for determining a path through a network. In order to do so, Bawa describes evaluating "routing characteristics" of alternate paths, selecting the alternate path having the least cost and, if multiple alternate paths have equal cost, selecting the route having

the fewest links. Bawa, col. 2, lines 8-20. The cost is determined using the currently utilized bandwidth of the links to determine the cost of a particular link or route. Bawa, col. 3, lines 27-58. Alternatively, Bawa indicates that average bandwidths might be used in place of currently utilized bandwidths. Bawa, col. 3, lines 59-65. However, as the Examiner has acknowledged, Bawa fails to describe determining the benefit of a link based on the capacity of the link and the minimum guaranteed bandwidth for existing flow(s) through the link.

Bertin also describes a mechanism for selecting routes in a network. Bertin, Abstract. In order to do so, Bertin discusses calculating a path through the system, using a previously calculated path through the system, or recalculating the path through the system. Bertin, col. 5, line 60-col. 6, line 17. As part of route selection, Bertin describes reserving part of the capacity of the link. Bertin, col. 10, lines 9-27. A portion of the theoretical capacity is reserved to provide "a reasonable quality of transmission." Bertin, col. 10, lines 20-25. In determining the amount of bandwidth to reserve, Bertin mentions two concerns: setting aside bandwidth for network control functions and to account for short term bandwidth violations of the different sources of traffic through the link. Bertin, col. 10, lines 15-27. Bertin describes calculating an "equivalent capacity" to determine the amount of bandwidth reserved. Bertin, col. 10, lines 30-40. This equivalent capacity is "a function of the source characteristics and of the network status." Bertin, col. 10, lines 36-38. Bertin expressly states that the "bandwidth reservation falls somewhere between the **average bandwidth required by the user** and the maximum capacity of the connection." Bertin, col. 10, lines 38-40 (emphasis added). Thus, the reserved bandwidth of Bertin is determined based upon the amount of bandwidth actually utilized.

Jurkevich describes a method and system for transmitting information during call connections in a network. Jurkevich, Abstract. As part of this method and system, Jurkevich does

describe reallocating bandwidth. Jurkevich, col. 43, lines 5-9. As part of this bandwidth reallocation, Jurkevich does mention determining congestion on a link, informing nodes associated with subscribers of the need to reallocate bandwidth due to this congestion. Jurkevich, col. 43, line 5-col. 44, line 1.

C. Claims 1-2, 4-6, 8-10, and 12-13 Are Not Unpatentable Under 35 U.S.C. § 103.

Appellant respectfully submits that the applied rejections of claims 1, 8, and 9 under 35 U.S.C. § 103 are without merit as the Examiner has completely failed to explain why Bawa in view of Bertin teaches or suggests the method, computer-readable medium, and system recited in claims 1, 8 and 9. Independent claims 1, 8, and 9 recite a method, computer-readable medium and system, respectively, for selecting a path between a source and a destination. In particular, selection of the path includes determining a benefit for each of some number of links connected to a node and selecting a link having the maximum benefit as the next link in the path. Claim 1 recites and Bawa in view of Bertin neither teaches nor suggests:

> determining a benefit for each link of a portion of the plurality of links, the portion of the plurality of links being coupled with the node, the benefit being determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link, the node being a part of the path . . .

Similarly, claim 8 recites and Bawa in view of Bertin neither teaches nor suggests:

> determining a benefit for each link of a portion of the plurality of links, the portion of the plurality of links being coupled with the node, the benefit being determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link, the node being a part of the path . . .

Claim 9 recites and Bawa in view of Bertin neither teaches nor suggests:

> first logic for determining a benefit for each link of a first portion of the plurality

of links coupled to a node in the path, the benefit being determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link . . .

Thus, claims 1, 8, and 9 recite the use of the minimum guaranteed bandwidth in route selection. As described in the specification, the minimum guaranteed bandwidth is the amount of bandwidth for which a customer typically pays and which a customer is guaranteed, regardless of the traffic through the network. Specification, page 5, lines 13-16 and page 9, lines 11-13 (indicating that the minimum guaranteed bandwidth is a feature in addition to or distinct from the current or recent actual flow through the network). This minimum guaranteed bandwidth might be zero or positive. Stated differently, if no minimum guaranteed bandwidth is stated, the minimum guaranteed bandwidth can be considered to be zero. See, for example, page 9, lines 7-13.

Using the method, computer-readable medium, and system recited in claims 1, 8, and 9, respectively, differentiated services can be accounted for. Specification, page 12, lines 15-19. Further, the path determined is thus optimized for minimum guaranteed bandwidths instead of being based solely on current bandwidths. Specification, page 12, lines 21-23. Stated differently, the use of minimum guaranteed bandwidths means that at least a portion of the route selection is not based upon the current status of the link (i.e. the flow rate through the link), but instead upon a minimum level of service that is already set.

Bawa in view of Bertin fail to teach or suggest determining the benefit for a link based on the minimum guaranteed bandwidth and selecting the link based upon this benefit. As the Examiner has acknowledged, Bawa does not describe a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link. Consequently, Bawa alone does not teach or suggest the method, computer-readable medium, and system recited in independent claims 1, 8, and 9.

Bertin fails to remedy the defects of Bawa. Bertin fails to teach or suggest the use of a minimum guaranteed bandwidth in route selection. More specifically, Bertin neither teaches nor suggests selecting a route based on a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link. Instead, Bertin selects a link using a reserved capacity on the link. In order to determine the reserved capacity Bertin utilizes the *average* bandwidth used. This bandwidth is distinct from a minimum guaranteed bandwidth. Although a customer may request a particular minimum guaranteed bandwidth based upon previous average usage or expected average usage, there is no requirement that a customer do so. In some applications, for example streaming video, the customer may select a minimum guaranteed bandwidth that is higher than the average bandwidth used in order to assure a particular level of performance. In other applications, the customer might select a minimum guaranteed bandwidth that is lower than the average bandwidth utilized. The customer might even select a minimum guaranteed bandwidth of zero. Furthermore, because the minimum guaranteed bandwidth is purchased by a customer, there may be no need to regularly recalculate the minimum guaranteed bandwidth to account for changes in bandwidth utilization. This is distinct from an average bandwidth which may be regularly recalculated in order to ensure that the desired level of performance is achieved. Consequently Bertin fails to teach or suggest the use of a minimum guaranteed bandwidth in determining a benefit of a particular link in order to perform route selection.

Appellant also notes that in the system of Bertin, there may be some minimum guaranteed bandwidth for the flows, even if this minimum guaranteed bandwidth is zero. Instead of basing route selection at least in part upon this (potentially zero) minimum, Bertin opts to use the reserved bandwidth, which is based on and falls between an *average* bandwidth required/used by the user

and the capacity of the link. In contrast, the minimum guaranteed bandwidth is guaranteed regardless of the traffic actually delivered by the customer. The minimum guaranteed bandwidth is also guaranteed regardless of other network conditions. There is no indication in Bertin that a minimum guaranteed bandwidth or level of service can or should be used in determining the reserved bandwidth and the route selected. Instead, Bertin is similar to the conventional systems described in Figure 2 of the present application in that the traffic actually delivered by user(s) is utilized to determine the available bandwidth. Consequently, Bertin fails to teach or suggest the use of a minimum guaranteed bandwidth in determining the benefit used in route selection.

Thus, Bawa fails to teach or suggest the use of a minimum guaranteed bandwidth in route selection. Bertin's usage of a reserved capacity and, therefore, an average bandwidth is distinct from the recited minimum guaranteed bandwidth and fails to remedy the defects of Bawa. Consequently, Bawa in view of Bertin fails to teach or suggest the method, computer-readable medium, and system recited in claims 1, 8, and 90, respectively. Stated differently, if the teachings of Bertin were combined with those of Bawa, the combined system might select paths by calculating the cost (as in Bawa) in combination with reserving a portion of the capacity of a link (as in Bertin). However, this combination would still utilize actual or average bandwidth used to determine the cost and an average bandwidth used to determine the reserved capacity. Consequently, Bawa in view of Bertin fails to teach or suggest selecting a route based on a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link. Bawa in view of Bertin thus fail to teach or suggest the method, computer-readable medium, and system recited in claims 1, 8, and 9, respectively. Accordingly, Appellant respectfully submits that claims 1, 8, and 9 are allowable over the cited references.

Claims 2 and 4-6 depend upon independent claim 1. Claims 10 and 12-13 depend on independent claim 9. Consequently, claims 2, 4-6, 10, and 12-13 are allowable for the same reasons discussed above with respect to claims 1 and 9.

Accordingly Appellant respectfully requests that the Board reverse the final rejection of claims 1, 2, 4, 5, 6, 8, 9, 10, 12, and 13 under 35 U.S.C. § 103.

D. Claims 3 and 11 Are Not Unpatentable Under 35 U.S.C. § 103.

Appellant respectfully submits that the applied rejections of claims 3 and 11 under 35 U.S.C. § 103 are without merit as the Examiner has completely failed to explain why Bawa in view of Bertin teaches or suggests the method and system recited in claims 3 and 11.

Claims 3 and 11 depend upon independent claims 1 and 9, respectively. Consequently, the arguments herein apply with full force to claims 3 and 11. Accordingly, claims 3 and 11 are allowable for the same reasons as claims 1 and 9.

Furthermore, claims 3 and 11 recite that the benefit is the capacity minus the sum of the minimum guaranteed bandwidth for each existing flow of the portion of the plurality of existing flows through the link. Consequently, claims 3 and 11 indicate that route selection is determined based upon a benefit that is specifically defined to include the minimum guaranteed bandwidth and capacity in a particular manner.

As discussed above, Bawa and Bertin fail to teach or suggest the use of any minimum guaranteed bandwidth. Bawa and Bertin likewise fail to mention a specific heuristic: the capacity of the link minus the sum of the minimum guaranteed bandwidths. Thus, any combination of Bawa and Bertin would also fail to teach or suggest using the capacity of the link minus the sum of the

minimum guaranteed bandwidths. Consequently, claims 3 and 13 are allowable over the cited references.

Accordingly Appellant respectfully requests that the Board reverse the final rejection of claims 3 and under 35 U.S.C. § 103.

E. Claims 7 and 14 Are Not Unpatentable Under 35 U.S.C. § 103.

Appellant respectfully submits that the applied rejections of claims 7 and 14 under 35 U.S.C. § 103 are without merit as the Examiner has completely failed to explain why Bawa and Bertin in view of Jurkevich teaches or suggests the method and system recited in claims 7 and 14.

Claims 7 and 14 depend upon independent claims 1 and 9, respectively. Consequently, the arguments herein apply with full force to claims 7 and 14. In particular, Bawa and Bertin fail to teach or suggest determining a route based upon a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link.

Jurkevich fails to remedy the defects of Bawa and Bertin. Appellant can find no mention in the cited portions of Jurkevich any minimum guaranteed bandwidth. Similarly, Appellant has found no mention in the cited portions of Jurkevich of selecting a route based upon a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link. Consequently, Jurkevich fails to separately teach or suggest the use of a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link.

Because Bawa, Bertin, and Jurkevich all fail to teach or suggest the use of a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link in determining the route, any combination of Bawa, Bertin, and Jurkevich would also fail to teach or suggest this feature. Thus, if the teachings of Jurkevich were added to those of Bawa and Bertin, the combination might notify a node associated with the sender regarding bandwidth reallocation, may reserve capacity from a link, and select a route based upon a calculation of costs that uses actual or average bandwidth used. However, this combination would still fail to teach or suggest determining a route based upon a benefit that is determined based upon the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows through the link. Accordingly, Appellant respectfully submits that claims 7 and 14 are allowable over the cited references.

Accordingly Appellant respectfully requests that the Board reverse the final rejection of claims 1, 2 ,3, 4, 5, 8, 9, 10, 11, 12, 13, 13, 16, 17, 18, 19, and 20 under 35 U.S.C. § 102(e).

F. Summary of Arguments

For all the foregoing reasons, it is respectfully submitted that Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 (all the claims presently in the application) are patentable for defining subject matter which would not have been obvious under 35 U.S.C. § 103 or anticipated under 35 U.S.C. § 102(e) at the time the subject matter was invented. Thus, Appellant respectfully requests that the Board reverse the rejection of all the appealed Claims and find each of these Claims allowable.

Note: For convenience of detachment without disturbing the integrity of the remainder of pages of this Appeal Brief, Appellant's "APPENDIX" section is contained on separate sheets following the signatory portion of this Appeal Brief.

Authorization for payment of the required Brief fee is contained in the transmittal letter for this Brief. Please charge any fee that may be necessary for the continued pendency of this application to Deposit Account No. 50-0563 (IBM Corporation).

Very truly yours,

August 3, 2005

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VIII. CLAIMS APPENDIX

1. A method for providing a path for a new flow between a source node and a destination node in a network having a plurality of nodes and a plurality of links between the plurality of nodes, the plurality of nodes including the source node and the destination node, each of the plurality of links capable of including a plurality of existing flows and having a capacity, each of the plurality of existing flows including a minimum guaranteed bandwidth, the method comprising the steps of:

(a) for a node of the plurality of nodes, determining a benefit for each link of a portion of the plurality of links, the portion of the plurality of links being coupled with the node, the benefit being determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link, the node being a part of the path; and

(b) selecting a link of the portion of the plurality of links to be part of the path, the link having a maximum benefit for the first portion of the plurality of links, the link coupling the node with a second node of the plurality of nodes.

2. The method of claim 1 further comprising the steps of:

(c) determining a next node of the plurality of nodes as being a node connected to the link selected in step (b).

3. The method of claim 1 wherein the benefit is the capacity minus the sum of the minimum guaranteed bandwidth for each existing flow of the portion of the plurality of existing flows through the link.

4. The method of claim 2 further comprising the step of:

(d) repeating the benefit determining step (a), the link selecting step (b) and the next node determining step (c) until the destination node is reached.

5. The method of claim 3 further comprising the step of:

(e) determining a net benefit for the path, the net benefit of the path being the lowest maximum benefit.

6. The method of claim 2 wherein the benefit determining step (a) further includes the step of:

(a1) eliminating a particular link of the portion of the plurality of links if the benefit for the particular link is less than or equal to zero.

7. The method of claim 2 further comprising the step of:

(d) determining whether the path between the source node and destination node can exist; and

(e) notifying a user if the path cannot exist.

8. A computer-readable medium including a program for providing a path for a new flow between a source node and a destination node in a network having a plurality of nodes and a plurality of links between the plurality of nodes, the plurality of nodes including the source node and the destination node, each of the plurality of links capable of including a plurality of existing

flows and having a capacity, each of the plurality of existing flows including a minimum guaranteed bandwidth, the program including instructions for:

(a) for a node of the plurality of nodes, determining a benefit for each link of a portion of the plurality of links, the portion of the plurality of links being coupled with the node, the benefit being determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link, the node being a part of the path; and

(b) selecting a link of the portion of the plurality of links to be part of the path, the link having a maximum benefit for the first portion of the plurality of links, the link coupling the node with a second node of the plurality of nodes.

9. A system for providing a path for a new flow between a source node and a destination node in a network having a plurality of nodes and a plurality of links between the plurality of nodes, the plurality of nodes including the source node and the destination node, each of the plurality of links capable of including a plurality of existing flows and having a capacity, each of the plurality of existing flows including a minimum guaranteed bandwidth, the system comprising:

first logic for determining a benefit for each link of a first portion of the plurality of links coupled to a node in the path, the benefit being determined based on the capacity of the link and the minimum guaranteed bandwidth for a portion of the plurality of existing flows that is through the link;

second logic for selecting a link of the first portion of the plurality of links to be part of the path, the link having a maximum benefit for the first portion of the plurality of links; and

a memory coupled with the first logic and the second logic, the memory for storing an identity of the link.

10. The system of claim 9 further wherein the second logic automatically determines a next node of the plurality of nodes as being a node connected to the link selected by the second logic.

11. The system of claim 9 wherein the benefit is the capacity minus the sum of the minimum guaranteed bandwidth for each existing flow of the portion of the plurality of existing flows through the link.

12. The system of claim 9 wherein a net benefit for the path is determined, the net benefit of the path being the lowest maximum benefit.

13. The system of claim 10 wherein the first logic further eliminates a particular link of the first portion of the plurality of links if the benefit for the particular link less than or equal to zero.

14. The system of claim 10 further comprising:

third logic for determining whether the path between the source node and destination node can exist and for notifying a user if the path cannot exist.

IX. EVIDENCE APPENDIX

X. RELATED PROCEEDINGS APPENDIX